ePlantData

Automating the Facility Supply Chain

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Texas Technology Showcase

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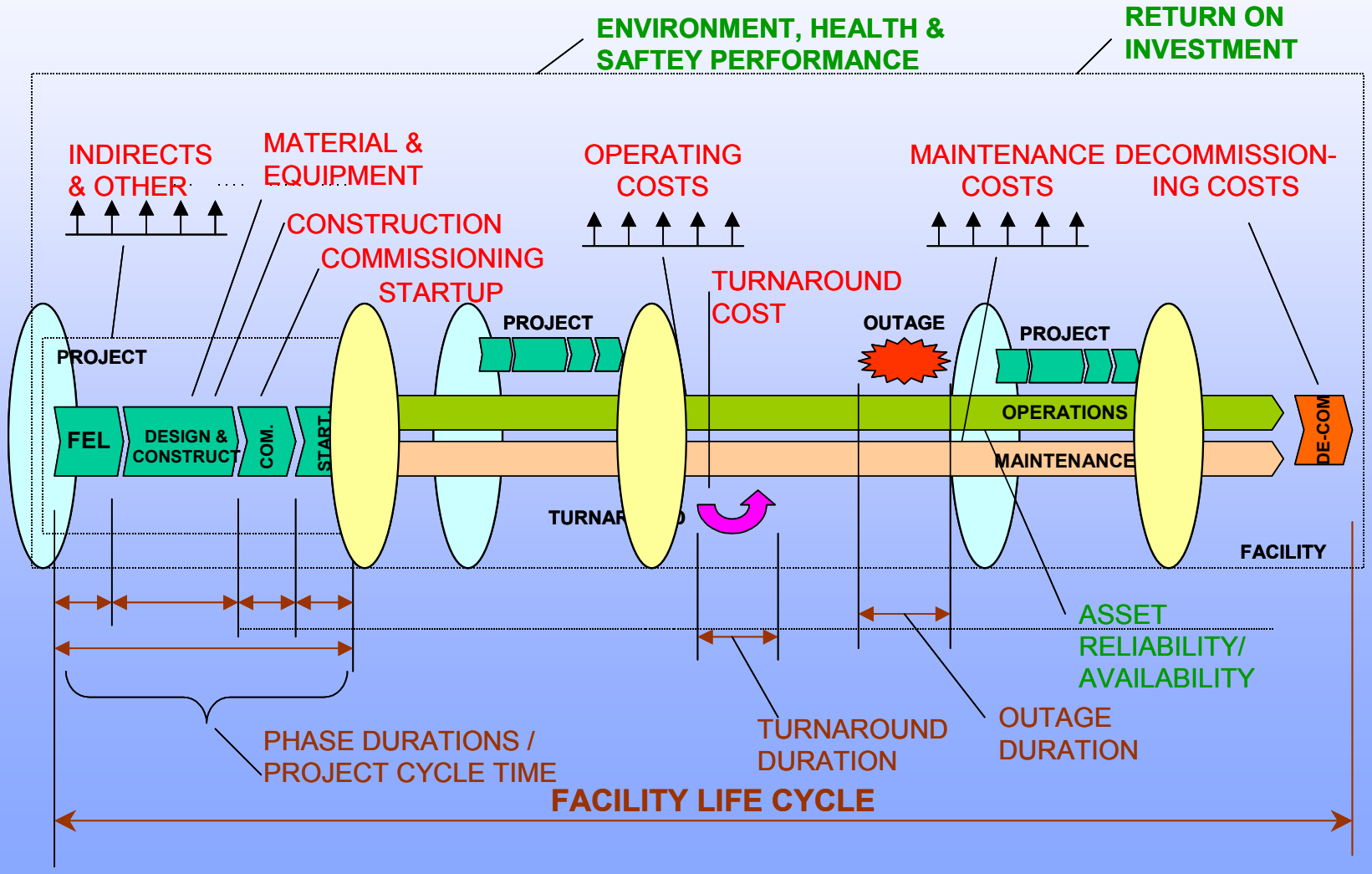
Outline

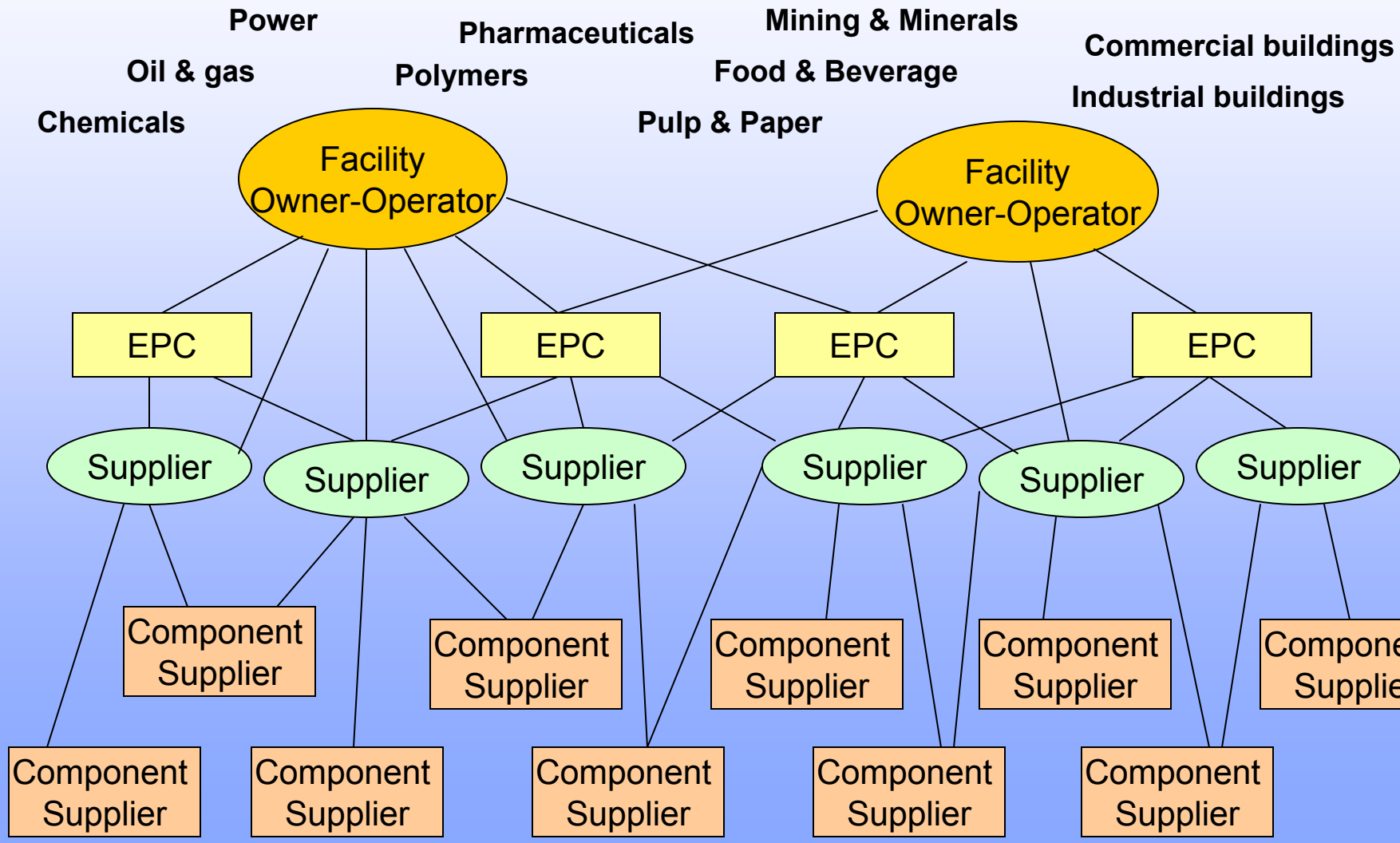
ePlantData™

- Facility supply chain information problem
- An industry collaboration to solve the problem

Facility Life Cycle
EPCOM



Facility Supply Network



Facility EPCOM Supply Chain Issues

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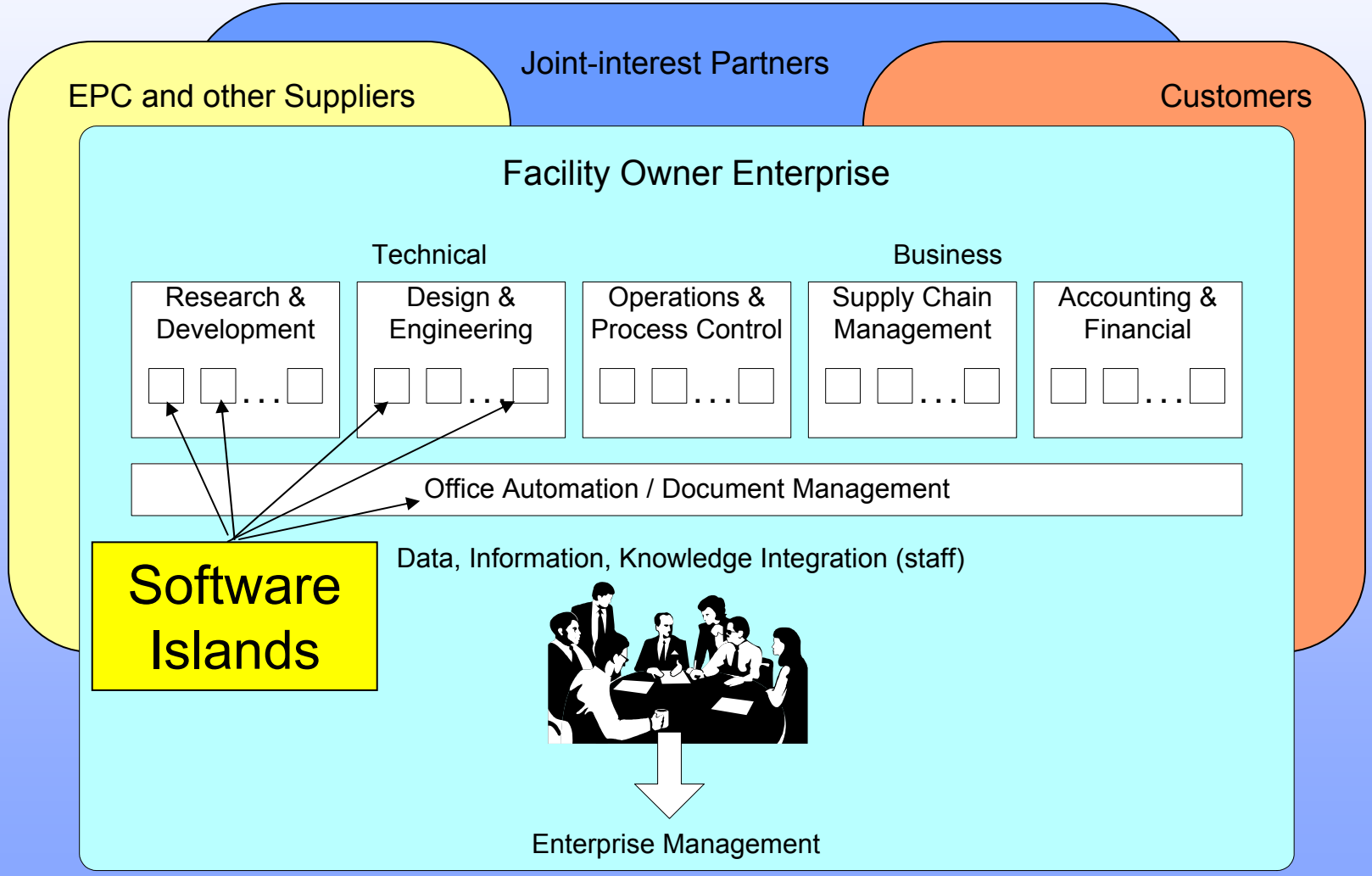
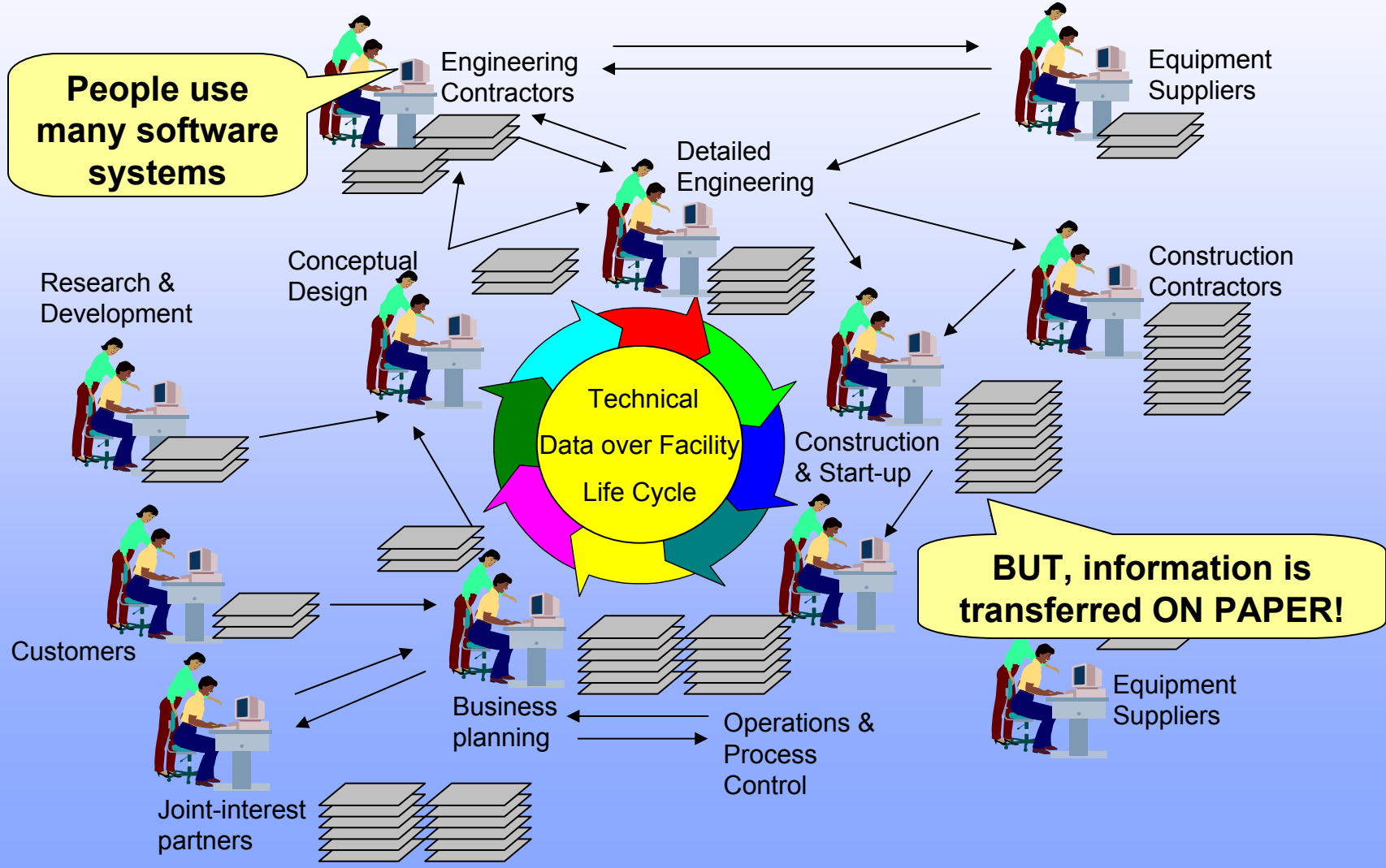
- Complex Supply Networks
  - Infinite combinations of suppliers/sub-suppliers
  - Multiple customer/supplier contracting options
- Competitive barriers to integration
  - Proprietary EPC technologies
  - Multiple variations on work processes
- Industry Fragmentation
  - Suppliers support multiple industry groups
  - No clear dominant leaders in any industry group
  - Few clear standards across industry groups

Problem: Software Islands



Problem: Lack of Interoperability



Facilities EPCOM Information Issues

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- Complex Information Sharing
  - Complicated technical/commercial information
  - Multiple incompatible information systems
    - Between customers, suppliers/sub-suppliers
    - Between functional processes, EPC vs O&M
- Competitive barriers to integration
  - Proprietary software systems
  - Competitive business strategies
- Legacy data problems
  - Software versions last 3-5 yrs
  - Facilities last 30-50 yrs

Facility EPCOM Information Exchange

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IN A
COMPLEX,
INFORMATION RICH,
TIME CRITICAL, FRAGMENTED,
HIGH (INVESTMENT) RISK ENVIRONMENT;

REALTIME, ERROR-FREE, ACTIONABLE ,
SUPPLY CHAIN INFORMATION
EXCHANGE IS

CRITICAL

Lack of Interoperability

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- **NIST auto industry study finding: *$1 Billion per year loss***
- **Construction industry estimates higher cost impact**
- **Longer cycle times impact schedules**
- **Electronic data not effectively reused, leveraged or archived**

FIATECH

… a collaborative organization to accelerate integration and automation of major capital facilities projects

ePlantData™

- **Fully Integrated and Automated TECHnology for the capital facilities industry**
- **Industry-led, collaborative, nonprofit, cooperative research consortium**
- **Established in July 2000**
- **Research, development & *deployment***
- **Manage projects *aggressively* to achieve practical results quickly**

FIATECH Members

… a mix of Owners, EPCs, Suppliers and Research Organizations

ePlantData

Abbott Labs
Aspen Technology
AVEVA, Inc.
B E & K
Bechtel
Bentley Systems
BNFL Engineering, Inc.
Burns and Roe Enterprises
CERL, U.S. Army Corp of Engin.
Chevron Texaco
Citadon
Daratech
Day & Zimmermann International
Dick Corporation
The Dow Chemical Company
E.I. DuPont de Nemours
ePlantData
Fluor Corporation
Impress Software
Intel
Intergraph
Jacobs Engineering Group
Lean Construction Institute
Merck & Co.
NASA
National Research Council of Canada
NIST/Building & Fire Research Lab
Pantellos Group Ltd
Parsons Energy & Chemicals
Primavera Systems
Reality Capture Technologies
Rohm and Haas Company
Saudi Aramco / Aramco Services
S&B Engineering
Smithsonian Institute
Skire
Stanford - CIFE
Time Industrial
Virginia Tech
Zachry Construction

FIATECH AEX Project and ePlantData

ePlantData

- Automating Equipment Information EXchange
  - Phase 1 August 2002 – February 2003
  - Phase 2 being planned (Meeting: March 27, 2003)
- ePlantData, Inc.
  - AEX Project Principal Investigator
  - Provide consulting services to industry
  - Expertise:
    XML software connectivity and data asset management for capital facilities

Users say: "Can't we automate this?"

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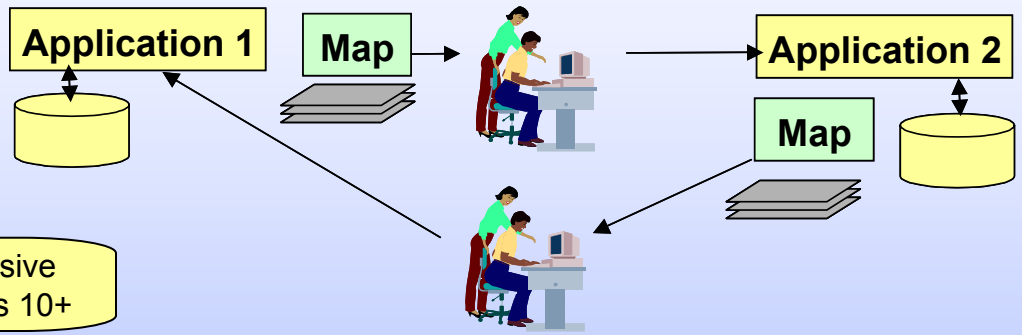
This is mostly how we do it now!

Manual

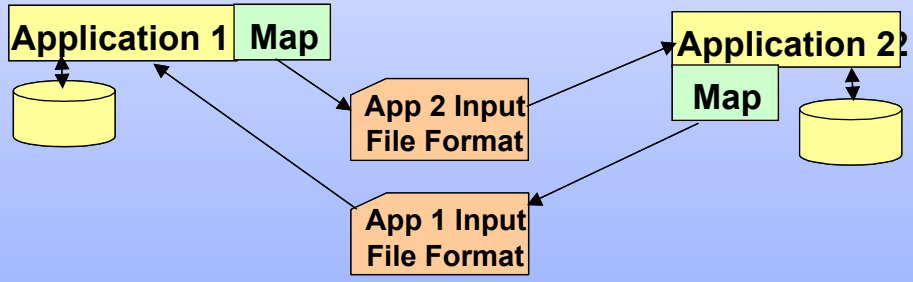
Total: N^2-N interfaces
App: N interfaces



For N > 3, this is too expensive
Equipment work process has 10+

Point-to-Point

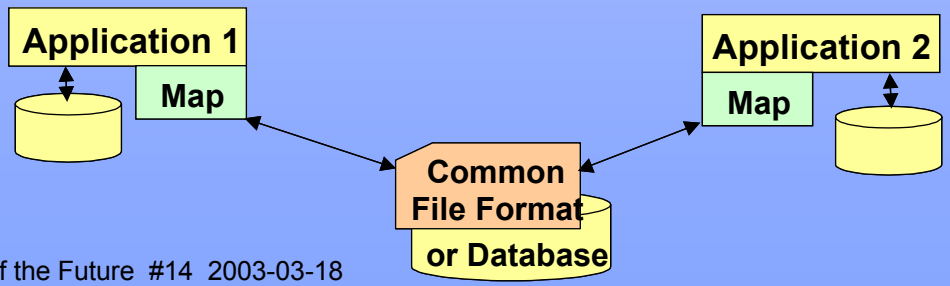
Total: N^2-N interfaces
App: N interfaces



The Best Way to Automate Data Exchange

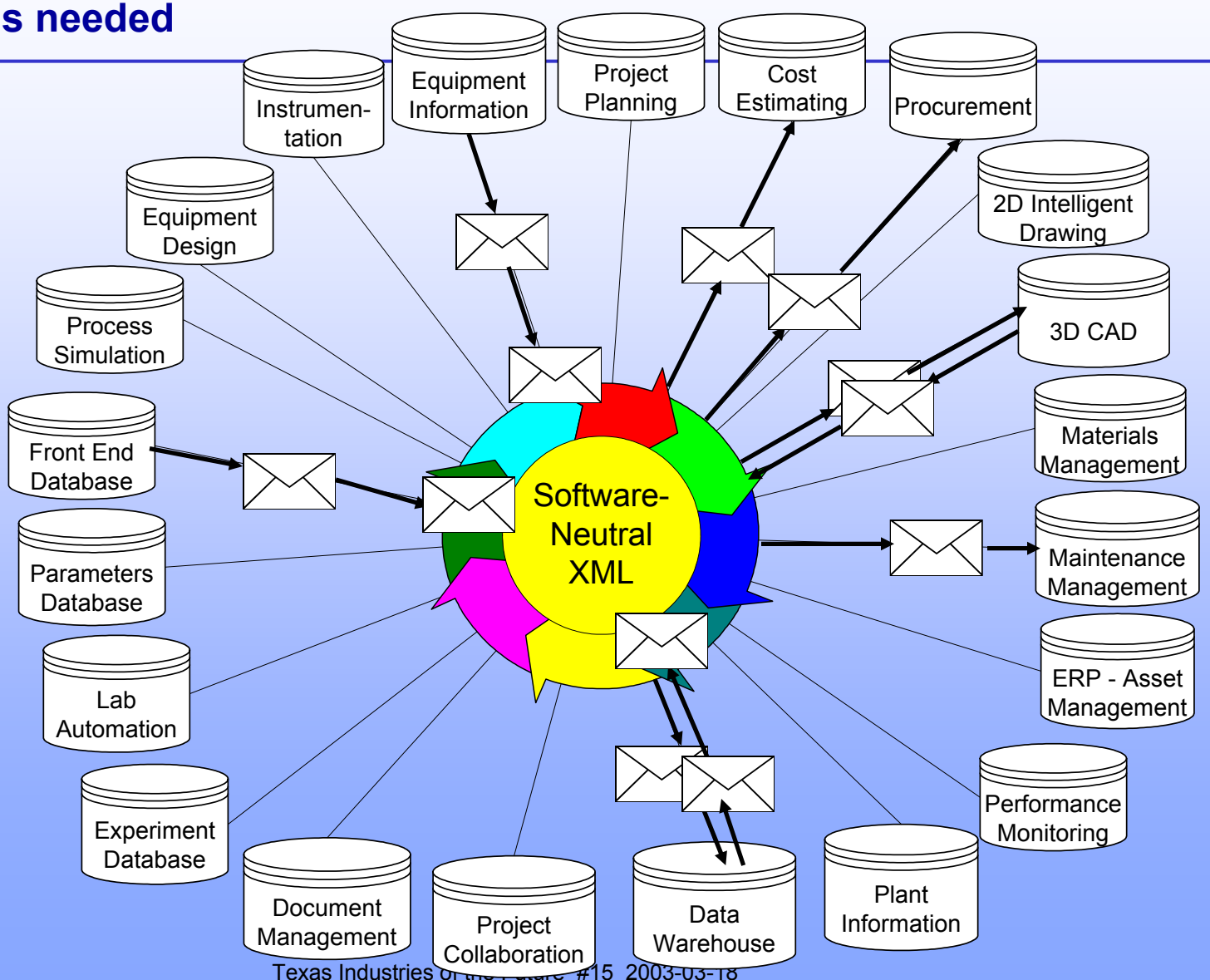
Common-File

Total: N interfaces
App: 1 interface



Interoperable Future Vision

Data is available to anyone, wherever, and whenever it's needed



Benefits of Interoperability

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Potential for $1 B annual savings*

- Reduce supply chain work process friction
- Reduce capital costs
- Shorten cycle times
- Reuse data over facility life cycle
- Reduce cost and implementation time for multi-vendor software integration

* To be estimated in current NIST study for the construction industry

Automating Equipment Information Exchange (AEX)

ePlantData

- **Objective:**
  - Enable electronic work processes through improved software interoperability
- **Approach:**
  - Select work processes with major barriers, unique challenges and significant potential benefits
  - Develop incremental, business-driven solutions
  - Practical *deployment in months, not years*
  - Promoting collaboration across industry groups to promote common, broad-industry solutions

AEX Initial Assessment

- **Assessed industry priorities**
  - Engineered equipment
  - Bulk equipment
- **Evaluated available technology**
  - EXtensible Markup Language (XML) is most promising
  - Leverage existing and previous industry efforts

AEX Project Results

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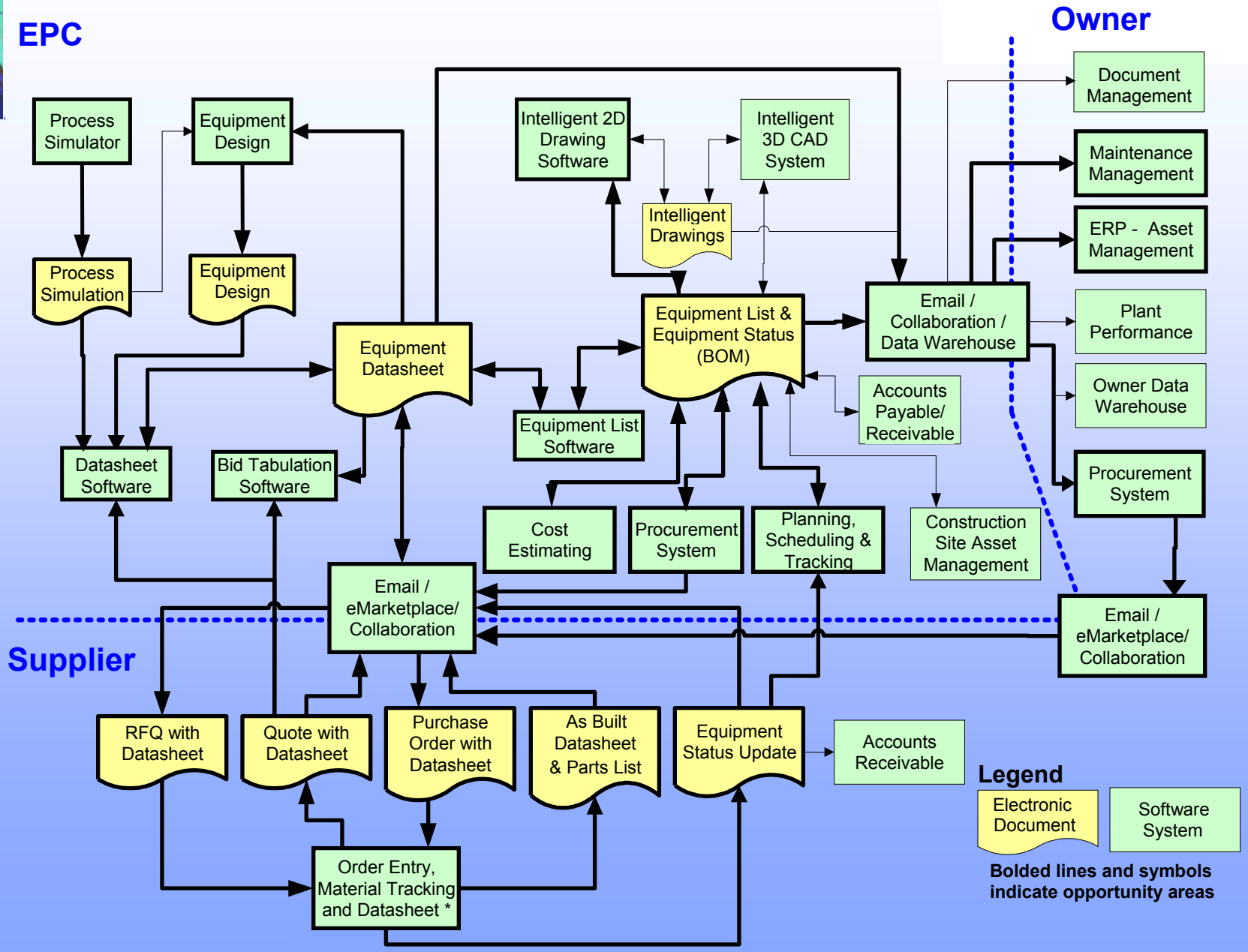
- **Work process and information flow analysis**
- **Software usage survey → High value transactions**
- **Reviewed/incorporated input from related XML efforts**
  - Messaging: PIDX, ebXML, OAGIS, BPEL4WS, RosettaNet
  - Subject Schemas: PIDX, PlantData XML, pdXML
- **Collaboration with ASHRAE, CII, DIPPR, NIBS O&M, PIDX, PIP, PlantSTEP**
- **Developing repeatable schema development process**

Software Information Flows



AEX Project Results

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- **"XML Schema Development Guidelines"**
  - GOAL: Consistent XML across multiple industry efforts
- **Core reusable XML schemas for multiple disciplines**
  - GOAL: Interoperability across multiple industry efforts
- **XML schemas for engineered equipment**
  - Basic information about all equipment types
    - equipment list exchange scenarios
  - Details for centrifugal pumps and shell & tube exchangers
    - data sheet exchange scenarios
  - Using API and PIP data sheets as input
- **XML schemas to support multiple work processes**
  - RFQ, Quote, PO, As Manufactured, Equipment List, BOM
- **14 companies participating**

AEX Future Focus

- Incorporate industry review feedback
- Publication of current results
- Deployment of current results in software
- Extend XML schemas to additional equipment types
- Explore new opportunity areas:
  - Bulk materials procurement
  - Equipment list scenarios
  - O&M Handover Scenarios

Discussion?

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